AB 970, AB 29X and SB 5X PEAK LOAD REDUCTION PROGRAM

2003 Supplemental Report – Executive Summary

CONSULTANT REPORT

Prepared for:
California Energy Commission

Prepared by:
Nexant

NOVEMBER 2005
CEC-400-2005-035-ES

Prepared By:
Nexant
Terry Fry
San Francisco, California
Contract No. 400-00-070

Prepared for:
California Energy Commission

John Sugar
Contract Manager

Monica Rudman
Project Manager

John Sugar
Manager
Public Programs Office

Valerie Hall
Deputy Director
Efficiency, Renewables and Demand Analysis Division

B. B. Blevins
Executive Director

DISCLAIMER

This report was prepared as the result of work sponsored by the California Energy Commission. It does not necessarily represent the views of the Energy Commission, its employees or the State of California. The Energy Commission, the State of California, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in this report.

Executive Summary

Responding to the extraordinary circumstances of the California energy crisis that reached its zenith in 2001, the California Energy Commission accepted responsibility to implement emergency activities to mitigate the crisis. As detailed in the 2002 Annual Report, the Energy Commission guided the State's rollout of the Peak Load Reduction Program (PLRP) and—in contracting for more than 725 MW of peak power reductions—successfully achieved 112 percent of its two-year goal. This supplemental report presents updated information on selected program elements that continued their project activities beyond the end of 2002. For purposes of inclusion, it also summarizes previously reported information in this independent study to measure, verify, and evaluate the PLRP's achievements, discussed in greater detail in the 2002 Annual Report and the 2003 Supplemental Report chapters.

ES-1 BACKGROUND

The California Legislature passed Assembly Bill 970 (AB 970) in August 2000, allocating $50 million in response to the emerging energy market imbalances that ultimately resulted in peak power shortages and rolling blackouts in early 2001. In response to continuing outages, the Legislature subsequently passed Senate Bill 5X (SB 5X) and Assembly Bill 29X (AB 29X) in April 2001. The last two bills combined, allocated nearly $900 million to state agencies to fund efforts that would reduce peak demand for electricity. The California Energy Commission received $327 million of this funding ($377 million including AB 970 funding) to implement programs that would provide "immediate benefits in peak energy demand reduction and more efficient use of energy."[1] Under a broad program known as the Peak Load Reduction Program (PLRP), the Energy Commission offered 12 program elements that were launched in two phases. The first phase, authorized by the passage of AB 970, began in late fall of 2000. The second phase started in May 2001 after the passage of SB 5X and AB 29X.

The Energy Commission retained Nexant, Inc. to provide independent evaluation of the peak demand savings of 8 of the 12 program elements. Nexant's evaluation comprises two components: (1) the measurement and verification of peak demand savings and (2) an evaluation of the performance of both program administrators and participants.

This 2003 Supplemental Report presents Nexant's updated measurement and verification findings. It answers the following key questions regarding the eight program elements evaluated:

- How much electric-peak load reduction, in megawatts (MW), did the PLRP achieve?
- How much did the peak load reductions cost?
- How well were the programs implemented and how did the market respond?

Each of the eight program elements that Nexant evaluated addresses either a particular market or technology; each is unique in terms of design, implementation, and expected savings. These

[1] Senate Bill 5X, Sher (Chapter 7, Statues of 2001) at SEC. 1(c).

eight program elements are listed and described below (the specific bill that funds the program element is in parenthesis):

- Agriculture Peak Load Reduction (SB 5X), which provides incentives for installation of more efficient processing equipment, pump repair, and alternative fuel projects.
- Cool Roofs (AB 970), Cool Savings (SB 5X), which provides incentives for installation of roofing materials that are highly reflective and emissive to reduce building cooling (air conditioning) loads.
- Demand Responsive Building Systems (AB 970 and SB 5X), which funds the installation of control, metering, and communications systems that enable facilities to curtail load in response to emergency electricity shortage notices.
- Energy Conservation Assistance Act (ECAA) Loan (AB 29X), which allows the Energy Commission to issue 3 percent interest rate loans to local governments, schools and colleges, hospitals, special districts, and public care facilities.
- Innovative Peak Load Reduction Program (AB 970 and SB 5X), which provides grants and contracts for projects to reduce peak demand not covered by any other program element (includes renewable energy development).
- LED traffic signals (AB 970), which provided grants to municipalities, CalTrans, to cover a portion of the costs of replacing incandescent traffic bulbs with light emitting diodes (LEDs)
- State Buildings and Public Universities (AB 970) offered contracts to state agencies and universities for the installation of energy efficiency measures or demand-responsive systems.
- Water Wastewater (AB 970) and Water Agency Generation Retrofits (SB 5X), which offers incentives to retrofit diesel and natural gas generators to reduce NO_x emissions and payments to municipalities for kilowatts saved as a result of new generation, load shifting, and energy efficiency projects at water and wastewater treatment facilities.

In addition to the eight program elements listed above, the Energy Commission was associated with three other elements: Classroom Materials (SB 5X), Real-Time Meters (AB 29X),[2] and Municipal Utility Districts (SB 5X). These program elements were not evaluated by Nexant and are not addressed in this report.

Of the eight programs listed above, this 2003 Supplemental Report presents updated information on two continuing programs—Agricultural Peak Load Reduction and Demand Response Building Systems. It also presents revised information on the Innovative Peak Load Reduction Program to reflect project completions through first quarter of 2003 and payments through December 31, 2003.

[2]The Energy Commission served as an administrator for the Real Time Meter Program and acted as an agent for the legislature for the Classroom Materials Program.

ES-2 SUMMARY OF PROGRAM ACCOMPLISHMENTS

Table ES-1 presents updated peak load reductions (electricity demand impacts) of each program element. The Demand Response program element is updated to reflect accomplishments through September 30, 2003 and the Agriculture program element through September 30, 2004. As indicated above the Innovative program element savings are updated to reflect savings as reported and verified through the first quarter of 2003. For other programs, the figures represent savings for projects reported as installed and as verified through December 31, 2002.

For the program elements that were not extended by the SB 5X or AB 29X legislation, the table presents figures from Nexant's December 2001 report. For program elements that were extended from AB 970, the figures reflect the combined impacts of AB 970 and the SB 5X- or AB 29X-funded activities.

Table ES-1: PLRP Savings Goals and Accomplishments (2003 Supplemental Update)

Program Element	Funding Source	Total Demand Reduction *Goal* by 6/1/03 (MW)	Total Demand Reduction *Contracted* (MW)*	Program Administrator Demand Reduction *Reported* Installed (MW)	Verified Savings (MW)	Realization Rate
Agriculture**	SB 5X	86.7	87.7	66.1	66.1	100%
Cool Roofs/ Cool Savings	AB 970 & SB 5X	40	19.3	11.5	11.0	96%
Demand Response***	AB 970 & SB 5X	214	261.1	238.8	216.2	90%
ECAA Loans	AB 29X	50	13.6	10.6	9.5	90%
Innovative^	AB 970 & SB 5X	152	212.9	149.9	137.0	91%
LED Traffic Signals	AB 970	10	7.1	7.0	6.6	94%
State Buildings	AB 970	50	53	57.1	51.2	90%
Water Agency/ Wastewater	AB 970 & SB 5X	50	73.1	62.8	52.2	83%
Totals		**652.7 MW**	**727.8 MW**	**603.8 MW**	**549.8 MW**	**91%**

* This includes contracted and, for programs that do not have formal contracts to deliver peak demand savings, committed or expected savings of identified projects.

** Updated savings based on reported installations through September 30, 2004.

*** To allow for summing overall PLRP reported savings and estimating overall PLRP realization rates, "reported" figures for the Demand Response program element include verified impacts of 2.4 MW for Sub-element 3 contractor Webgen, which did not report savings, and 0.4 MW for Sub-element 4 contractor Energyn, which also did not report savings. Figures represent reported and verified savings through September 30, 2003.

^ Figures represent reported and verified savings through March 31, 2003.

The goal of program elements evaluated in this report is a cumulative 652.7 MW of peak demand reduction to be achieved by June 1, 2003. Indicators of program accomplishment include the total peak demand reduction *contracted*, representing the peak load savings that individual participants have signed up (contracted) to deliver toward the PLRP goal, including

savings that participants are expected to deliver. The results presented in Table ES-1, showing 112 percent of June 1, 2003 PLRP goals under contract, indicate that the Energy Commission's recruiting and contracting activities are substantially complete and extremely successful.

The *reported* peak demand savings of 603.8 MW (an increase of 38 MW since the 2002 Annual Report) represents the self-reported peak demand savings by program administrators but not verified by Nexant. For most program elements, the reported peak demand savings derive from installed projects that produce verifiable savings in all peak hours; for other projects, however, the reported savings are available only under special conditions and are considered potential savings.[3] *Reported installed* savings includes both savings and potential savings for installed projects. The figures presenting *verified* peak demand savings indicate that documented peak load reductions total 549.8 MW (an increase of 87.2 MW since the 2002 Annual Report). By capturing effects of programs that continued into 2003 (and for Agriculture, into 2004), this supplemental report provides a substantively complete accounting of the Peak Load Reduction Program: the small amounts of residual program activity beyond the time of this supplemental report (e.g., to complete committed project installations) is not expected to change estimates of verified savings, realization rates, or cost-effectiveness.

ES-3 PROGRAM COST-EFFECTIVENESS

For each of the program elements, Nexant calculated two indicators of cost-effectiveness: the simple cost per kW and the levelized (annualized) cost per kW per year.[4] Simple cost per kW is an impact-weighted average of all program element cost/kW values. Levelized costs per kW-year are based on average project or impact lifetimes specified in each program element section in the 2002 Annual Report (and Supplemental Reports to Agriculture, Demand-Response, and Innovative program elements).

Table ES-2 presents the cost-effectiveness of each program element. These costs are based on the peak demand savings in place by December 31, 2002, and the amount of invoiced funds the Energy Commission has paid or plans to pay for the savings. As such, the figures represent the marginal cost per kW-year incurred by the program elements in stimulating the market, but do not include all the administrative costs of launching and running the programs.

Table ES-2: Program Element Cost-effectiveness (2003 Supplemental Update)

Program Element	Invoiced Amount ($1000)	Verified Savings (MW)	Simple Cost Effectiveness ($/ kW)	Levelized Cost Effectiveness ($/kW-yr)
Agriculture – SB 5X	$13,068	66.1	$200	$44

[3] Much of the impacts in the Demand Responsive Program Element and some of the impacts of the Agricultural and State Buildings program elements were achieved by projects that demonstrated the capability to curtail load in response to contractual or monetary inducements. As such, they are *potential savings* that might be realized during emergency curtailments.

[4] Levelized costs, defined in the Energy Commission's *Standard Practice Manual: Economic Analysis of Demand-Side Management Program,* (October 2001), account for appropriately amortizing project costs over the expected useful lifetime of equipment or impact.

Program Element	Invoiced Amount ($1000)	Verified Savings (MW)	Simple Cost Effectiveness ($/ kW)	Levelized Cost Effectiveness ($/kW-yr)
Cool Roofs – AB 970	$3,558	5.38	$665	$79
Cool Savings – SB 5X	$4,032	6.40	$629	$75
Demand Response – AB 970	$8,380	102.1	$82	NA
Demand Response – SB 5X	$19,271	115.4	$167	NA
ECAA Loans – AB 29X	$2,614**	9.5	$275	$33
Innovative – AB 970	$5,411	32.0	$169	$24
Innovative – SB 5X	$25,367	105.1	$241	$34
LED Traffic Signals -- AB 970	$10,811	6.34	$1,707	$369
State Buildings** -- AB 970	$4,957	51.2	$97	$44
Water/ Wastewater – AB 970	$5,061	45.1	$112	$30
Water Agency Generation – SB 5X	$2,181	5.8	$374	$45

* For most programs, achievements and costs represent 2002 end-of-year figures. Exceptions include Agriculture (which includes results through September 30, 2004), Demand Response (which includes results through September 30, 2003), and Innovative (which includes results through March 30, 2003 and costs through December 31, 2003).

** The ECAA "invoiced amount" represents the magnitude of the loan subsidy. Project loans and service rebates totaled $39.1 million.

ES-4 SPECIFIC PROGRAM ELEMENT HIGHLIGHTS

This section describes highlights of each program element, as previously presented in the 2002 Annual Report, with supplemental information appended to the Agriculture, Demand Response, and Innovative program elements.

ES-4.1 Agricultural Peak Load Reduction Program (including Supplemental Update)

The Agricultural program element has successfully recruited and approved more than 1000 projects that are contributing more than 65 MW of peak demand savings. Of the program element's contributions to peak load reduction, more than 48 MW of demand-responsive project contracts were executed within months of the program element kick-off in June 2001. The demand-responsive projects (Category 3 projects) account for a majority of expected program element impacts at a cost of $18/kW-year, among the most cost-effective of the overall PLRP. The overall program element cost-effectiveness of $44/kW-year makes the program a particularly attractive part of the PLRP portfolio.

Pump testing and pump repair projects account for the majority of projects (590 of 1018 approved projects), enabling more efficient delivery of water to the economic benefit of the agricultural sector. It is not clear, however, that the projects reduce peak demand for electricity unless combined with TOU metering or other strategies that would change pumping usage patterns.

Program performance, as rated by participant satisfaction and assessed by Nexant's administrator audits, was superior. Survey results indicate that Category 3 participants were particularly

motivated by program's economic incentives and would not otherwise have installed demand-responsive capabilities. It is clear from the speed of project implementation, however, that efficiency-related projects in the agricultural sector require time to develop and install, a key consideration for programs designed for emergency load relief. Whereas the demand-responsive projects of Category 3 were subscribed within months upon program initiation in 2001, the last of the approved efficiency projects of Category 1 are only concluding in late 2004.

The program element has demonstrated success in encouraging the more widespread adoption of advanced energy technologies in California's agricultural industry. Clean technology applications, for example, include biogas generation, alternative fuels, telemetry equipment and control systems, and thermal storage load shifting.

ES-4.2 Cool Roofs/Cool Savings (AB 970, SB 5X)

As of mid-December 2002, the AB 970 and SB 5X program elements combined, had enrolled over 2,150 customers and achieved 11.0 MW of verified savings through the installation of over 33 million square feet of cool roof material, all at a cost of less than $80/kW-year.

During the course of the program, two of the administrators, Sacramento Tree Foundation and San Diego Regional Energy Organization enrolled almost 1,000 participants each indicating that small public or private organizations can make a program attractive and successful. The use of roofing contractors was the most successful manner in which to market this product.

The program substantially increased public awareness about the benefits and savings associated with cool roof materials. This helped offset the original slow penetration of the cool roof products. Additional time and effort will be needed to maintain the momentum to a point of widespread and permanent change regarding awareness of this technology.

This technology is particularly susceptible to degradation from atmospheric pollutants, which coat the roofs with dirt reducing their ability to reflect heat thus reducing their cool capabilities. Flat roofs, which the program targeted, could lose as much as 30 percent of their reflectivity in situations where the roof accumulates a high concentration of dirt.

ES-4.3 Demand-Responsive Building Systems (including Supplemental Update)

The Demand Responsive (DR) Buildings Systems program sub-elements 1 and 2 have achieved considerable success in establishing peak energy demand savings potential during Stage II and III California Independent System Operator (CAISO) emergency signals. As of December 31, 2002, the total verified potential peak demand savings for these two sub-elements was 202 MW. By September 30, 2003 (the end of the 2003 summer peak season), the total verified peak demand savings potential for the entire program element had risen to 216 MW, including effects of sub-element 3 (contractor-aggregated small commercial participants) and sub-element 4 (contractor-implemented residential projects).

By the end of the 2003 summer peak season 2003, Nexant verified that sub-elements 3 and 4, which had accounted for 2.4 MW in 2002, had achieved 14.2 MW of demonstrated peak savings potential. The 2002 Annual Reported noted that the two sub-elements had expected to achieve

approximately 41 MW of savings potential; the difference between expected and observed was largely due to slower than anticipated market response. The most successful contractor, ICF Consulting, accounted for 11.4 MW of the verified 14.2 MW (80 percent of the combined impact of sub-elements 3 and 4), and reported continued recruitment and testing of participants beyond the end of the 2003 summer period. ICF, which had recruited 473 participants as of September 30, 2003, reported an additional 645 participants between the end of the summer peak season and the end of the 2003 calendar year. Nexant cannot verify the reported additional participants or associated peak impacts, but notes that the 645 incremental participants would be expected to produce approximately 15.5 MW in additional peak savings potential.

The DR program is responsible for an increase in interest in demand responsive technologies as a way to efficiently manage facility power costs. Along with this increase in interest has been an increase in technology development and marketing of existing products currently available.

To successfully rollout DR programs, protocol and program guidelines, including evaluation methods need to be in place prior to start of the program. Concurrently developing programs and implementing them is unwise and often leads to an acceptance of unfit projects, lax evaluation techniques, and participant frustrations.

Nexant uncovered that participation in these types of programs is greatly affected by the prevailing conditions in electricity markets—and is susceptible to rapid change. Because of that, Nexant offers four policy recommendations as a means to limit market confusion over DR resources brought about by an energy crisis like the one suffered in California, and to improve program persistence under inevitable changing market conditions:

1. Limit the number of program offerings presented to participants at any one time
2. Extend program funding cycles and their durations
3. Establish standardized and consistent DR program parameters
4. Try to understand program participants' perspectives on proposed incentive structures

Nexant discovered that one of the more vexing problems with evaluating the DR programs results from calculating baseline data. In order to evaluate baselines that were affected by days with temperature ranges outside of the norm, Nexant developed the temperature-adjusted load baseline calculation method. This was used in place of the more traditional CAISO baseline method on occasions when wide temperature swings needed to be consisted in the analysis of potential savings. There was however a problem that occurred when neither the temperature-adjusted method nor the CAISO method were the one that participants had used to arrive at their reported savings.

Fully automated demand responsive programs have the highest potential of savings. However, Nexant discovered that managers of some business activities, including industrial processes, are not comfortable to give over full operation of their building to this fully automated approach.

Supplemental findings in the analysis of sub-elements 3 and 4 give insight into customer motivation and market behavior. Major motivating factors include both economic considerations

(i.e., the opportunity to save money on energy bills) and concerns for system reliability, in nearly equal weights. Because the technology and program concepts are relatively new, however, penetrating the market takes time and persistent promotional effort: although sub-element 3 was initiated during California's power crisis, participation was still ramping up in the third and fourth quarters of 2003. Significantly, participants in both sub-elements 3 and 4 report high levels of satisfaction with the program, as well as its communications and procedures

Cost-effectiveness parameters continue to favor large customer-focused programs. Sub-elements 1 and 2 were focused on large customers and were extremely cost-effective at $80/kW and $233/kW, respectively. Sub-elements 3 and 4, which were expected to be less cost-effective because of their experimental nature, produced peak savings potential at costs of $484/kW and $2,958/kW, respectively. In both cases, the costs were significantly higher than projected costs. One primary factor was the underestimation of significant costs of marketing DR implementation to residential and small commercial customers. The front-ended nature of marketing campaign costs and the observed back-end increase in sub-element 3 participation create the expectation that cost-effectiveness will increase over time. Another significant factor was the overestimation of demand savings on a per participant basis, partly due to inherent uncertainty in projecting customer response to new technologies and experimental program features.

ES-4.4 Energy Conservation Assistance Act (ECAA)

The ECAA program element is a stable initiative, implemented continuously by the Energy Commission since 1979. It capably meets its primary objective of energy savings, and at the same time produces significant peak load reductions—a reported 11 MW by December 31, 2002.

Although MV&E activities are not yet complete, it appears likely that reported demand savings might be somewhat overstated. Reflecting the program element's historical emphasis on economic savings (which accrue primarily through energy cost reductions and secondarily through demand-charge savings), application guidelines and the Energy Commission's review process appear less rigorous in estimating demand savings than in estimating energy savings. A compounding factor is that, in general, peak demand savings are more difficult to predict accurately.

Relative to other PLRP program elements, the rate of project dropouts during the application and approval process appears to be somewhat high. This indeed could be the result of the more stringent application process because this is a loan program. This assumption was upheld by interviews with non-participants who withdrew projects from consideration, which suggests that complexities of the review process were considered daunting and at least some applicants believed financial assistance could be obtained through other programs. Had a more rigorous application and review process been implemented for the purposes of producing more accurate peak demand savings estimates, however (see previous observation), dropout rates might have been even higher.

ES-4.5 Innovative Peak Load Reduction (including Supplemental Update)

The Innovative program element has been extremely successful in recruiting peak load reduction projects, having contracted for more than 140 percent of its goal. Verified savings of 137 MW represent more than 90 percent of the program element's goal.

The program element has also demonstrated the powerful contribution that innovative technologies can make to efforts to reduce the State's peak demand for electricity. For example, the program element has encouraged investment in and installation of pumped-storage reservoirs for shifting demand to off-peak hours, the largest roof-mounted photovoltaic array in the US, landfill-gas and biomass generation, and many other clean energy technologies.

The Innovative program element has achieved significant impacts (second highest in magnitude of the Peak Load Reduction Program's program elements) at an average annualized cost in the range of $24/kW-year to $34/kW-year, placing it among the most cost-effective of all program elements.

Use of third-party administrators has largely been successful; administrative efficiencies are good and participants are satisfied with their program experiences. Administrators seeking to encourage mass-market participation were somewhat less successful than those who targeted larger projects.

ES-4.6 Light Emitting Diode (LED) Traffic Signals

The energy and peak demand savings achieved through the installation of LED traffic light modules persists year round and has reduced traffic signal energy and maintenance costs for public agencies by up to 70 percent.

As a result of the program element's accomplishments and the availability of technical specifications and the lower costs of modules, the Energy Commission has incorporated LED traffic signal modules into its Building and Appliance Standards. All traffic signals manufactured after March 1, 2003 and sold in California must not exceed a specified wattage requirement. Currently, only LED traffic signal modules can meet this requirement.

The percentage of public agencies converting intersections to LEDs will continue to rise as prices for the modules drop, energy cost remain high and California's efficiency standard for traffic signals take effect on March 1, 2003. Using today's energy rates, the average simple payback for converting an incandescent intersection to one that uses all LEDs is less than five years.

The program delivered more modest energy savings at a slightly higher cost ($369/kW-year) than the other program elements. Cost savings associated with year-round energy savings of the installed technologies, although not a subject of this evaluation, are believed to be more than sufficient to justify the incremental investment costs.

ES-4.7 State Buildings and Public Universities Program

This program element funding was almost fully subscribed in 2001 and resulted in 57.1 MW of peak demand savings. Four state agencies and one private firm were State Building and Public University Program Element grant recipients. There is a full accounting of the programs activities in Nexant's 2001 annual report.

Nexant's examination of the program element's projects verified the persistence of peak demand savings through the summer of 2002. The Department of General Services continued monitoring of projects is the determinant factor in sustaining energy and peak demand savings.

ES-4.8 Water Wastewater and Water Agency Generation Retrofits

The combination of the AB 970 and SB 5X programs produced verified peak savings of 52.2 MW and is expected to increase to 60.0 MW by June 2003. With the addition of SB 5X-funding the program opened up to load shifting and generation projects as well as to the AB 970-funded efficiency projects. These new program components were the stimulus for the large increase in projects and ultimately the large increase in savings.

Accuracy of savings and higher realization rates were strongly tied to appropriate and thorough upfront project evaluations and savings calculations. Applications that submitted estimated load reductions typically resulted in projects that had low realization rates.

Water/wastewater projects appear to have needed more time to develop and implement than was available for the initial phase of this program element. The short lead times came in conflict with the time needed to properly plan, bid, and construct projects. The combined effect of these issues resulted in a number of projects requesting extensions.

If policies and contracts facilitated the sale of electricity back to the grid, at least under emergency conditions, two of the projects evaluated would have been able to reach full capacity and add 1.4 MW of peak savings.

ES-5 CONCLUSIONS

An appropriate perspective on the achievements of the Peak Load Reduction Program should consider the extraordinary circumstances facing California's energy sector at the time when the PLRP was conceived. Funding legislation was passed, program element concepts were developed, and activities launched with a primary objective of achieving rapid reductions in the State's demand for peak power. Program development and design activities, which normally play out over a period of two years or more for utility-sponsored programs, were compressed into a period of a few months. It is in this context that this report offers the following conclusions, based on Nexant's evaluation of the Peak Load Reduction Program:

- In less than the amount of time that would normally be devoted to planning programs of this magnitude, the Energy Commission has successfully launched and implemented the PLRP, contracting for 110 percent of its two-year goal of more than 700 MW of peak power reduction for the program elements subject to this evaluation. To complete this perspective, the PLRP should be considered in the context of the Public Goods Charge-

funded statewide programs that have an annual goal of about 200 MW peak demand reduction for 2003.[5] Clearly, the magnitude, timeliness, and effectiveness of the Energy Commission's efforts in implementing the PLRP are unprecedented in the State.

- The most successful program elements in achieving rapid reduction of peak loads have been the Demand Responsive program element and the Agricultural program element's Category 3 projects. These activities have put in place the potential to curtail up to a contracted 307 MW of peak load. To perform reliably in the event of future peak power shortages, however, the participating projects will require continued financial motivations—either through curtailment incentives or tariff mechanisms.[6]
- Several factors lead to the conclusion that the Peak Load Reduction Program was both well designed and well implemented. These factors include the following:
  - Market response was exceptional. In aggregate, PLRP goals were met or exceeded in contracted agreements to reduce peak demands.
  - Evaluation of the administrative process indicated that compliance with program guidelines, record keeping, and reporting requirements was very good or excellent in all program elements.
  - A survey of market participants revealed a high degree of satisfaction with program element features, guidelines, and administration.
- Although program implementation efficiency was more than satisfactory, enhancements could have improved overall effectiveness. For example, the compressed timeframe for implementation often meant only the most critical information was communicated to stakeholders. The program rollout might have been more efficient if there had been more time to develop a detailed matrix for communication and understanding among participants. The lack of a more comprehensive understanding of participant reporting requirements could have improved accuracy of reported savings estimates and subsequent verification of savings.
- The free rider/ free driver issue should be more thoroughly explored.[7] To date, MV&E activities have focused on the gross impacts or the differences between the participants' baseline usage patterns before the program implementation and their patterns after program implementation. It is recommended that the magnitude and effect of both of these issues be determined.

[5] The Public Utilities Commission has allocated roughly $235 million of the Public Goods Charge, originally authorized in AB 1890 and reconfirmed in AB 995, for statewide programs in 2003 targeted to achieve 201 MW of peak demand reductions. The PGC-funded programs are primarily designed for energy efficiency impacts – not peak load reductions – and so the targets are not entirely comparable to the PLRP's.

[6] The Energy Commission is presently engaged in a joint rulemaking proceeding (R.02-06-001) that is investigating tariff-based approaches to increase the market's demand-responsiveness through time-of-use and critical peak pricing tariffs and pilot programs.

[7] Free riders are defined as participants who would have taken similar peak reduction actions even in the absence of the affected program. Free drivers are participants who, as a direct result of program implementation, put into practice *additional* peak reduction measures that are not accounted for within the established program parameters.

- Innovative energy-efficiency measures (which are typically associated with conservation, not peak management) can also be effective in reducing peak demand. The Agricultural, Cool Roofs, Innovative, LED, and Water Agency program elements all demonstrated that substantial peak reductions could be achieved with more rapid deployment of clean, innovative, and renewable energy technologies.

The following sections of this report provide detailed presentation and discussion of Nexant's MV&E methods and updated findings for the following program elements of the Energy Commission's Peak Load Reduction Program:

- Section 1: Agricultural Peak Load Reduction Program (updated for 2003)
- Section 2: Cool Savings
- Section 3: Demand Responsive Program (updated for 2003)
- Section 4: ECAA
- Section 5: Innovative Peak Load Reduction Program (updated for 2003)
- Section 6: LED
- Section 7: State Buildings
- Section 8: Water Wastewater